PRELIMINARY AND SHORT REPORTS

PANTHENOL: ITS TOPICAL USE IN CUTANEOUS ULCERATION*

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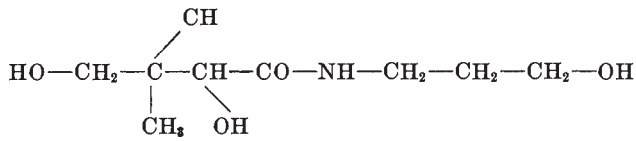
Treatment of chronic ulcers, often recalcitrant to usual methods of therapy, poses a problem which may be extremely difficult. Prolonged periods of bed rest are not always practical; supportive and even surgical modalities frequently fail. Therefore, any new agent which offers a reasonable basis for success is worth clinical investigation.

Laboratory experiments with Panthenol,† the hydroxy-analog of pantothenic acid, were called to our attention. This alcohol (d-a, γ - dihydroxy-N- (3-hydroxypropyl) -$\beta.\beta$.-dimethylbutryamide) has the following structural formula:



It is approximately as effective as calcium pantothenate in overcoming pantothenic acid deficiency states in black rats and in mice; stunted growth and achromotrichia in black rats, and alopecia in mice. On oral administration it is converted by rat and by man into pantothenic acid. Quantitatively the amounts of pantothenic acid excreted in the urine following ingestion of Panthenol are actually greater than with an equivalent dose of calcium pantothenate. The intravenous administration of sodium pantothenate or of Panthenol to normal subjects increases the urinary output of pantothenic acid by equivalent amounts.

The cutaneous application of Panthenol to pantothenic acid deficient rats produces a normal pantothenic acid concentration in the liver, and reverses deficiency states (1). Furthermore, it has been demonstrated that pantothenic acid in rats is necessary for normal function of epithelial tissue (2). This finding, and the evidence of excellent absorption of Panthenol from the skin suggested its use in defective wound healing. Preliminary studies with an ointment containing Panthenol in 5% concentration on patients with severe burns, infected operative wounds, and decubital ulcers, showed unusually rapid epithelization.(3, 4)

It therefore seemed advisable to undertake additional studies involving the cutaneous application of Panthenol to clinical conditions requiring stimulation of granulation tissue and epithelization, such as various recalcitrant suppurative lesions and chronic ulcers.

CLINICAL STUDY

A number of patients at Bellevue Hospital, on the dermatologic wards and in the Out-Patient Department, were selected for study. Of these, 51 remained under observation for sufficient time to be included in the series. There were 42 men and 9 women, varying in age from 15 to 83 years. Thirty-five were hospitalized and 16 treated in the clinic.

The material used was Panthenol incorporated in 5% concentration in a lanolin base or

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† The Panthenol ointment used was provided by the manufacturers, Hoffmann-LaRoche, Inc., Nutley, New Jersey.

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in a carbowax base. Both bases were used interchangeably during the period of study. A jelly which was also tried at the inception of the investigation was soon discarded because of its unsatisfactory physical properties. The Panthenol ointment was applied directly to the lesion and covered with a gauze dressing. Reapplication was made in 24 or 48 hours, depending on the stage of healing. Badly infected lesions were first cleansed with weak solutions of either hydrogen peroxide or potassium permanganate. Of the 51 patients, 28 cleared entirely while under observation and 17 showed some degree of improvement. Two patients did not respond to therapy at all, and six developed complications.

TABLE I

Patients treated with 5% panthenol ointment

DIAGNOSIS	NO. OF PATIENTS	BASE USED			CURED	IMPROVED			OTHER		COMMENT
		Carbowax	Lanolin	Jelly		Marked	Moderately	Slight	No Imp.	Worse	
Pyoderma with ulceration	14	6	7	2	11	1		1			
Pyoderma, superficial	2	2	1		1	1					
Hypostatic dermatitis with ulceration	15	4	11		4	4	2	1	1	3	
Decubitus ulcer	2	2	1		2						
Radiodermatitis with ulceration	1		1			1					
Factitial ulcer	2	2	1		2						
Traumatic ulcer	7	2	5		4	3					
Arteriosclerotic ulcer	3	2	3		2					1	
Trophic ulcer	1		1			1					
Sickle cell ulcer	1		1						1		
Infectious eczematoid dermatitis	2	1	1		2						
Dermatitis herpetiformis	1	1				1					
Total	51	22	33	2	28	12	2	2	2	4	

Several patients were treated with more than one preparation of Panthenol thus accounting for the disparity in figures.

CONCLUSIONS

Topical application of Panthenol, the alcoholic analog of pantothenic acid, incorporated in ointment bases containing either lanolin or carbowax, favorably influenced the course of various ulcerative and pyogenic dermatoses. A majority healed and many showed various degrees of improvement. Many patients had had previous prolonged trials of therapy with other modalities with indifferent results. There were a few side reactions, but none was proved due to either primary irritation or allergy.

It is likely that with the use of auxiliary and supportive therapy (such as could be included in actual treatment but not in the present clinical investigation,) particularly in crural ulcers, Panthenol will produce even better results than in this study.

REFERENCES

1. Burlet, E. Die percutane Resorption von Panthenol (3-[2′,4′-Dioxy-3′,3′-dimethyl-butyryl]-aminopropanol. Jubilee Volume Emil Barell 92–97, 1946.
2. Jürgens, R. & Pfaltz, H. Entzündliche Erkrankungen der Respirationsorgane bei Ratten infolge von pantothensäuremangel. Zeit. f. Vitaminforsch. **14:** 243–269, 1943.
3. Leder, M. E. Die Behandlung einer schweren Verbrennung mit Bepanthen-salhe "Roche". Schweiz. med. Wchnschr. **76:** 828–829, 1946.
4. Sciclounoff, F. & Naz, E. La Thérapeutique par l'acide pantothénique en application locale. Schweiz. med. Wchnschr. **75:** 767–769, 1945.